

## Claims

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1. An isolated nucleic acid molecule which encodes a T cell derived inducible factor, the complementary sequence of which hybridizes, under stringent conditions, to at least one of SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 29, SEQ ID NO: 24 or SEQ ID NO: 25.

2. The isolated nucleic acid molecule of claim 1, wherein said isolated nucleic acid molecule encodes a protein having the amino acid sequence of the protein encoded by SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 29, SEQ ID NO: 24 or SEQ ID NO: 25.

3. The isolated nucleic acid molecule of claim 1, wherein said molecule is cDNA.

4. The isolated nucleic acid molecule of claim 1, wherein said molecule is genomic DNA.

5. The isolated nucleic acid molecule of claim 2, the nucleotide sequence of which consists of the nucleotide sequence SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 29, SEQ ID NO: 24 or SEQ ID NO: 25.

6. The isolated nucleic acid molecule of claim 4, having the nucleotide sequence of SEQ ID NO: 25.

7. An isolated nucleic acid molecule which encodes the protein encoded by the isolated nucleic acid molecule of claim 1.

8. Expression vector comprising the isolated nucleic acid molecule of claim 1, operably linked to a promoter.

9. Expression vector comprising the isolated nucleic acid molecule of claim 2, operably linked to a promoter.

10. Expression vector comprising the isolated nucleic acid molecule of claim 3, operably linked to a promoter.

11. Expression vector comprising the isolated nucleic acid molecule of claim 4, operably linked to a promoter.

12. Expression vector comprising the isolated nucleic acid molecule of claim 5, operably linked to a promoter.

13. Expression vector comprising the isolated nucleic acid molecule of claim 6, operably linked to a promoter.

14. Recombinant cell comprising the isolated nucleic acid molecule of claim 1.

15. Recombinant cell comprising the isolated nucleic acid molecule of claim 2.

16. Recombinant cell comprising the expression vector of claim 8.

17. Recombinant cell comprising the expression vector of claim 9.

18. Recombinant cell comprising the expression vector of claim 10.

19. Recombinant cell comprising the expression vector of claim 11.

20. Isolated protein encoded by the isolated nucleic acid molecule of claim 1, and having a molecular weight of about 17-30 kilodaltons as determined by SDS - PAGE.

21. The isolated protein of claim 20, comprising at least 120 amino acids of the protein encoded by SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 29, SEQ ID NO: 24, or SEQ ID NO: 25.

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22. The isolated protein of claim 21, comprising at least all but the 40 N terminal amino acids encoded by SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 29, SEQ ID NO: 24, or SEQ ID NO: 25.
23. The isolated protein of claim 22, comprising at least all but the 20 N terminal amino acids encoded by SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 29, SEQ ID NO: 24, or SEQ ID NO: 25.
24. Antibody which specifically binds to the isolated protein of claim 20.
25. The antibody of claim 24, wherein said antibody is a monoclonal antibody.
26. A method for determining effectiveness of interleukin-9 on a cell, comprising contacting said cell with an agent specific for at least one of (i) an isolated nucleic acid molecule which encodes a protein whose amino acid sequence is identical to the amino acid sequence encoded by the nucleotide sequence of SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 29, SEQ ID NO: 24 or SEQ ID NO: 25 and (ii) a protein whose amino acid sequence is identical to the amino acid sequence encoded by the nucleotide sequence of SEQ ID NO: 7, SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 29, SEQ ID NO: 24 or SEQ ID NO: 25 and determining interaction of said agent with (i) or (ii) as a determination of effectiveness of interleukin-9 on said cell.

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27. The method of claim 26, wherein said agent is an antibody which specifically binds to (ii).
28. The method of claim 26, wherein said agent comprises the isolated nucleic acid molecule of SEQ ID NO: 7, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO: 29, SEQ ID NO:24, or SEQ ID NO: 25.
29. A method for stimulating activation of a STAT protein comprising administering an amount of the protein of claim 20 sufficient to stimulate activation of said STAT protein.
30. The method of claim 29, wherein said STAT protein is STAT1 , STAT3 or STAT 5.
31. A method of inhibiting activation of a STAT protein, comprising administering an amount of an antagonist of the protein of claim 20 sufficient to inhibit stimulation of expression of said STAT protein by said protein.
32. The method of claim 31, wherein said STAT protein is STAT1 , STAT3 or STAT 5.
33. A method for determining presence of TIF in a sample, comprising contacting said sample with an agent which binds to TIF or a nucleic acid molecule encoding TIF, and determining said binding as a determination of TIF in said sample.

- 34. The method of claim 33, wherein said agent is an antibody.
- 35. The method of claim 33, wherein said agent is a nucleic acid molecule.
- 36. A method for screening to determine if a substance influences IL-9 activity, comprising adding said substance to a sample of TIF producing cells, in the presence of IL-9, and determining production of TIF, wherein a difference in production of TIF by said cells as compared to production of TIF by said cells in presence of IL-9 but not said substance indicates said substance influences IL-9 activity.
- 37. The method of claim 36, wherein said substance is an IL-9 inhibitor or antagonist, said method further comprising determining lower levels of TIF production by said cells in the presence of said substance as compared to its absence.
- 38. The method of claim 36; wherein said substance is an IL-9 activator, said method further comprising determining higher levels of TIF production by said cells in the presence of said substance as compared to its absence.

39. A method for determining an aberrant level of IL-9 activity in a subject, comprising determining level of TIF in a subject and comparing said level to a normal level, differences therebetween being indicative of an aberrant level of IL-9 in said subject.

40. The method of claim 39, wherein said aberrant level is excess endogenous IL-9.

41. The method of claim 39, wherein said aberrant level is insufficient endogenous IL-9.

42. The method of claim 40, wherein said subject suffers from asthma, an allergy, or lymphoma. *(A)*

43. A method for inhibiting IL-9 induced activity in a subject in need thereof, comprising administering an amount of a TIF inhibitor sufficient to inhibit IL-9 induced activity.

44. The method of claim 43, wherein said TIF inhibitor is an antisense molecule.

45. The method of claim 43, wherein said inhibitor is an antibody.

46. A method for treating a subject suffering from asthma or an allergy, comprising administering to said subject an amount of a TIF mutine sufficient to alleviate said asthma or allergy. *(A)*

47. A method for determining if a mutein of TIF is therapeutically useful, comprising contacting a cell which produces IL-9 with said mutein, and determining effect of said mutein on production of IL-9, reduction thereof being indicative of possible therapeutic efficacy for said mutein.

48. A method for determining susceptibility to a condition characterized by aberrant expression of TIF, comprising determining nucleotide sequence of a TIF gene of a subject believed to possess an aberrant TIF gene, presence of an aberrant TIF gene being indicative of possible susceptibility to asthma or allergy.

49. The method of claim 48, comprising contacting a sample taken from said subject with a pair of oligonucleotide primers which amplify said TIF gene.

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